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anywhere west of Central New York. The stone implements, and I believe there are none of copper, are ruder and less varied than those first mentioned and are found not only in Western Vermont, but also over the eastern portion of the State and the other New England States. The pottery, occurring chiefly in fragments, is incised and cord-marked and decorated with a great variety of patterns made up of straight lines, circles, &c. This and the stone objects, which seem to be associated with it, appear to be the work of a different and less highly cultivated people than those who made the finer specimens first mentioned, and their makers appear to have lived all over New England and Eastern New York. Thus we have evidence of the former occupation of Western Vermont by a widely spread people, of much skill in the manufacture of stone objects; a people having commenced with those living in the copper region of Lake Superior, and with those living in Florida or some portion of the South, for the shell beads are, some of them, if not all, made from Southern species of mollusks, and also of an ancient, but later occupation by a people of less wide distribution and less development in arts.

### THE INDIAN CENSUS.\*

Colonel Garrick Mallery, U. S. A., now attached to the Bureau of Ethnology at Washington, discussed last Monday a subject of national interest. On the nine previous occasions when the census of the United States was directed to be taken, the Indians, not taxed, forming a part neither of the voting population nor of any basis of representation, were simply disregarded. The present law provides for the enumeration and the ascertainment of their statistics. This change in legislation may have arisen from the abandonment of the doctrine of necessary extinction, the *fera natura* theory combated by Colonel Mallery at the Nashville meeting of the Association in 1877, and from the probability of the early absorption of many of the Indians into the body of the taxable and voting population, which renders them of future political importance, a factor the effect of which should be estimated. It is also probable that the interest in ethnologic research, noticeable throughout the country, has influenced Congress. General Walker, the able superintendent of the census, has availed himself of an agency that never before existed. The Bureau of Ethnology, lately established by act of Congress and now under the direction of Major Powell, was entrusted with the whole of the duty in question. Without the preparation already made by the Bureau of Ethnology the work could not be done accurately, and by scientific methods. It might possibly have fallen into the hands of mere office seekers, perhaps of persons interested in the concealment if not perpetration of frauds. The enumeration of the Indians is difficult. Though restrained more or less successfully within specified limits, they are still apt to range over large regions, and to be away, for long periods from the place of their compulsory or voluntary habitation. This is especially the case in Summer, and the day of June fixed for the general census being inappropriate, the first day of October was selected instead. There are other causes interfering with accuracy. If fraud is attempted it is assisted by an enlarged paper-number of recipients of rations, and the Indians themselves are tempted to swell their lists, both for rations and annuities. Hostile or troublesome bands, under differing circumstances, seek to exaggerate or conceal their military strength. The aboriginal reluctance of each person to give his own name, and of all to speak of deceased relatives and friends is well known. These and many other obstacles require that the duty shall be in charge of persons familiar with the Indian customs, who both know what to look for and how to find it. The forms and schedules of the general census being wholly inapplicable, others have been prepared with great care. They are five in number. 1. *Population*. Each sheet is confined to one family in one dwelling, that unit being of much greater importance in savage and barbaric than in civilized life. The location of the dwelling is given by legal and natural subdivisions, also its description; if a house, whether of brick, stone, adobe, frame or log; if pueblo, whether stone or adobe; if lodge,

whether of cloth, skins, slabs, poles, brush, bark, tule, stone or earth. The head of the family, often a woman, is first designated, and the relationship of each person to that head. For each individual the Indian name is given, with the English translation of that name; also the English, Spanish, French or other name habitually used. This serves not merely for identification, but brings out the names originally designated on the system of the *gens* organization, and also the title or sobriquet generally bestowed in after-life from some achievement or circumstance often of sociologic, if not historic, interest. Mixture of blood between several tribes, and between Indians and whites and negroes, is noted, and all matters relating to advance in civilization, such as wearing citizen's dress, amount and kind of personal and real property ownership, in which is recognized cultivation of land and sources of subsistence. 2. The schedule for *vital statistics* inquires into the causes of deaths during the past year, and the prevalence of the diseases to which Indians are subject; among other interesting points obtaining in the Indian tongue a statement from the head of the family, or medicine man, of the cause of death, thus showing the aboriginal theories of diseases. 3. *Industries*, embraces every appropriate particular under that head, classified for full and mixed bloods, and adopted whites and negroes, all by tribes instead of by families and individuals, as in the "population" schedule, and with details more useful for statistical purposes. 4. *Education*, is on the same principle. Schedule 5 guides and simplifies research into the wondrous system of ramified consanguinities and affinities, on which savage society is founded and depends. The work of the present census of the Indians will be of great practical value. It will correct some popular errors which have obstructed judicious legislation, confused statesmanship and misled philanthropy, and will render frauds difficult of perpetration. The schedules also show that advantage has been taken of this opportunity to lead research into points of deep scientific interest.

### EXPERIMENTS ON THE STRENGTH OF YELLOW PINE.\*

By PROF. R. H. THURSTON.

The elasticity of yellow pine timber as used in construction is very variable, the modulus varying from one to three millions, the average being about two millions in small sections, and a little above one and a half millions in large timber.

The highest values are as often given by green as by seasoned timber, and that, under sixteen square inches section and fifty-four inches length, at least, the magnitude of the modulus of elasticity is independent of the size of the piece.

The density of the wood does not determine the modulus; since the figure varies sometimes directly and sometimes inversely with the density, even where the wood is as nearly as possible in the same condition as to seasoning.

A high modulus usually accompanies high tenacity and great transverse strength, but it is not invariably the fact that maximum ultimate strength is accompanied by initial stiffness.

The pseudo moduli, determined by taking considerable deflections, are usually not greatly different from those determined from small deflections and light loads. The values of these moduli often decrease with increase in deflection.

An inspection of the woods tested plainly indicates, in the opinion of the writer, that the density of the pines is so considerably modified by the amount of pitch contained in the sap channels that it cannot be regarded as indicative of the strength of the timber. Where quite free from sap the wood usually exhibits increase of strength and elastic resistance to deflection, with increase of density.

The strength of timber, otherwise similar, is greatly affected by its structure, and the resistance offered to stresses applied transversely is greatest when the sections

\*Read before the A. A. A. S., Bo

1880.

\*Read before the A. A. A. S., Boston, 1880.

of the timber taken transversely exhibit most nearly vertical lines of grain.

The modulus of rupture by transverse stress varies, for yellow pine, from  $R = \frac{3}{8} \frac{Wl}{bd^2} = 10,000$  to 17,000, the highest values being usually obtained from well-seasoned wood. An average value may be taken as  $R = 13,000$  for good timber, which in the formula  $W = C \frac{bd^2}{l}$  gives  $C = 866$  pounds or, practically,  $W = 9000 \frac{bd^2}{l}$  for good yellow pine.

The modulus of rupture varies as irregularly and with as little regard to size or density of the material as does the co-efficient for elasticity.

In the use of such materials, the only safe course for the designing and constructing engineer is evidently to adopt a moderate value of the modulus in proportioning his work, and by careful inspection and test to secure the rejection of all material which is not of good quality.

As has been seen, careful inspection may sometimes lead to the selection of material twenty-five per cent. superior to the average of good timber, and fifty per cent. more valuable than the lower grades such as are often sold in our markets.

The Paper was illustrated by a series of tabulated statements, being the result of experiments made to arrive at the conclusions prescribed in this abstract.

#### BOOKS RECEIVED.

##### MORTUARY CUSTOMS AMONG THE NORTH AMERICAN INDIANS.\*

The primitive manners and customs of the North American Indians are rapidly passing away under influences of civilization and other disturbing elements. In view of this fact, it becomes the duty of all interested in preserving a record of these customs, to labor assiduously, while there is still time, to collect such data as may be obtainable. This seems the more important now, as within the last ten years an almost universal interest has been awakened in ethnologic research, and the desire for more knowledge in this regard is constantly increasing. A wise and liberal government, recognizing the need, has ably seconded the efforts of those engaged in such studies by liberal grants from the public funds; nor is encouragement wanted from the hundreds of scientific societies throughout the civilized globe. The public press, as the mouth-piece of the people, is ever on the alert to scatter broad-cast such items of ethnologic information as its corps of well-trained reporters can secure. To induce further laudable inquiry, and to assist all those who may be willing to engage in the good work, is the object of this preliminary work on the Mortuary customs of the North American Indians, and it is hoped that many more laborers may, through it, be added to the extensive and honorable list of those who have already contributed.

It would appear that the subject chosen should awaken great interest since the peculiar methods followed by different nations, and the great importance attached to burial ceremonies, have formed an almost invariable part of all works relating to the different peoples of our globe; in fact no particular portion of ethnologic research has claimed more attention.

In view of these facts it might seem almost a work of supererogation to continue a further examination of the subject; for nearly every author, in writing of our Indian tribes, makes some mention of burial observances; but these notices are scattered far and wide on the sea of

this special literature, and many of the accounts, unless supported by corroborative evidence, may be considered as entirely unreliable. To bring together and harmonize conflicting statements, and arrange collectively what is known of the subject, has been the writer's task. This volume forms the third of a series, the first of which, entitled "Introduction to the Study of Indian Languages," was written by Major J. W. Powel, the director of the Bureau of Ethnology, Washington; the second being by Col. Garrick Mallery, and entitled, "Introduction to the Study of Sign-Language among the North American Indians."

The following provisional arrangement of burials has been adopted in arranging the facts presented in this work.

1. BY INHUMATION in pits, graves, holes in the ground, mounds, cists, and caves.
2. BY CREMATION, generally on the surface of the earth, occasionally beneath.
3. BY EMBALMMENT, or a process of mummifying, the remains being afterwards placed in the earth, caves, mounds or charnel house.
4. BY AERIAL SEPULTURE, the bodies being deposited on scaffolds, or trees, in boxes or canoes.
5. BY AQUATIC BURIAL, beneath the water or in canoes, which were turned adrift.

Major J. W. Powel gives the assurance that to those who are willing to take part in this work by earnest and faithful research, Dr. Yarrow will give full credit for their work in his final publication, and we would suggest that those able and willing to assist should put themselves in communication with the Bureau of Ethnology, Smithsonian Institution, Washington, and request instructions as to the best methods of recording their work.

WE have received the second chapter of a serial article, published in the *Journal of Nervous and Mental Diseases*, and entitled the "Architecture and Mechanism of the Human Brain." Its author, Dr. Spitzka of this city one of our own contributors, intends in this article to, build up the brain before the reader's eye, as it were, beginning with the simplest foundations and gradually erecting thereon the higher superstructures which are the basis of the intellectual operations. Throughout the chapters thus far issued the writer has interlarded hundreds of interesting and suggestive observations drawn from the fields of Comparative Cerebral Anatomy and Embryology. The style is not the least creditable feature of the work, and especially its preliminary chapter, which is as easy reading as a novel, and the complex features of the structure of the most complete organ in the body becomes the property of the reader almost without effort on his part.

The recent number of the *American Journal of Microscopy* contains, among other articles, the following: *Pelomyxa*, *Palustris*, and other Rhizopoda, by W. G. Lapham—An improved glass for the collection and examination of Deposits (with drawings): Highest Magnifying Powers, by Allen Y. Moore: Several letters of interest, reports of societies, and useful notes.

We were pleased to see *Nature*, in a recent number, give a handsome recognition of the merits of this journal which we conscientiously indorse.

The *American Monthly Microscopical Journal* for August has also some very useful articles on the preparation and mounting of objects. It gives a New Form of Injecting Apparatus, by Mr. Justin Spaulding: A Useful Culture-Cell, by Dr. George M. Sternberg: Histology of the Foetal Lung. There are also two articles of a series now publishing by this journal, which will prove valuable to microscopists—the Classification of the Protista, by Haeckel (translated), and a description of the "Family Volvocina."

\*Introduction to the Study of Mortuary Customs among the North American Indians. By Dr. H. C. Yarrow, Act. Asst. Surg. U. S. A., Smithsonian Institution, Washington, Bureau of Ethnology. J. W. Powell, Director.